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TECHNICAL NOTE

MISSILE-X PROGRAM
LOGISTIC ELEMENT MANAGEMENT PLAN
FOR
MAINTAINABILITY INTERFACE LEM

15 August 1977

Prepared for

DEPARTMENT OF THE AIR FORCE
SPACE AND MISSILE SYSTEMS ORGANIZATION (AFSC)
ICBM Program Office

Under Contract F04606-76-A-0087-R901

Publication W77-1953-TN03

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(12)

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LOGISTIC ELEMENT MANAGEMENT PLAN
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One of 12 LEM Plans
Prepared for

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FOR

MAINTAINABILITY INTERFACE LEM

15 August 1977

SPACE AND MISSILE SYSTEMS ORGANIZATION
AIR FORCE SYSTEMS COMMAND

Prepared by

Logistics (MNL)
Deputy for Intercontinental Ballistic Missiles

MISSILE-X PROGRAM
LOGISTIC ELEMENT MANAGEMENT PLAN
FOR
MAINTAINABILITY INTERFACE LEM

15 August 1977

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Director, Logistics
Deputy for Intercontinental Ballistic Missiles

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Assistant Deputy, Missile-X

FOREWORD

This Maintainability Interface Logistic Element Management Plan is one of twelve plans supplementing the guidance and direction for the Integrated Logistic Support (ILS) program as delineated in the Missile-X Integrated Logistic Support Plan (ILSP). Whereas the ILSP provides general guidance and direction for integrating all logistic elements into the overall program requirements, this plan treats the specific actions, milestones, and coordination efforts of the Logistic Element Manager for the Maintainability Interface. It has been written to assist him in fulfilling his responsibilities toward achieving the ILS objectives of the MX Program.

The majority of information contained in Sections 1 through 4 herein is common to all plans. Sections 5 and 6 present information pertinent to the M-LEM's efforts.

CONTENTS

1
INTRODUCTION

1.1 BACKGROUND

In accordance with DoD Directive 4100.35, the promulgating authority of AFR 800-8, and the guidance provided by AFP 800-7, the MX Program Office has implemented an Integrated Logistic Support program for the MX Weapon System. The ILS program, as delineated in the Integrated Logistic Support Plan (ILSP), is intended to ensure that the weapon system is designed with due consideration given to its supportability and that the required support will be attained within an affordable, minimum life cycle cost.

For the MX System, logistic elements – areas of support activity that collectively comprise the management concept of ILS – have been defined. These are:

Maintainability Interface (M)

Reliability Interface (R)

Nuclear Hardness and Survivability Interface (NH&S)

Maintenance Planning (MP)

Support and Test Equipment (SE)

Supply Support (SS)

Transportation and Packaging (T&P)

Technical Data (TD)

Support Facilities (SF)

Personnel and Training (P&T)

Logistic Support Management Information (LSMI)

Logistic Support Resource Funds (LSRF)

For each area of support activity, the MX Program Office has designated a Logistic Element Manager (LEM) responsible for managing the accomplishment of the tasks associated with his element.

1.2 PURPOSE

This document is a Logistic Element Management Plan for the Maintainability Interface element. It has been written to provide the M-LEM with guidance in managing the Maintainability Interface element and ensuring the integration of ILS maintainability requirements into the system design process. This plan, and those developed for the other eleven logistic elements, will become supplementary documents to the ILSP.

1.3 MX PROGRAM

The MX Program has been implemented to provide the technology base for the development of an improved land-based strategic missile weapon system. Efforts are being directed toward the design, development, and deployment of an ICBM system within one of two nuclear hardened, multiple aim point (MAP) basing alternatives. The two currently favored basing options are the buried-trench and shelter-based weapon systems.

Full scale development (FSD) of the MX Weapon System is divided into two major efforts: missile development, including the missile and canister; and weapon system development, which includes the MAP basing hardware, software, and facilities, and the integration of the missile/canister with these equipments and facilities.

2
SCOPE

This Logistic Element Management Plan structures the Maintainability Interface logistic requirements of the ILSP into identifiable responsibilities of the M-LEM, and delineates the tasks associated with these responsibilities. The plan is applicable to the FSD phase of the MX Weapon System, with overlap to the preceding validation and system definition phases and succeeding production/deployment phases. The plan applies to all elements of the weapon system, including the air vehicle, support functions, and the selected basing option. In addition, this plan:

a. Provides an overview of the MX program management concept, and the LEMs' position in the management structure.

b. Describes the ILS program and the function of the M-LEM within that program.

c. Describes the participation of the M-LEM in the ILS Management Information System.

d. Indicates the interdependencies among tasks and the coordination among all members of the Integrated Logistic Support Management Team (ILSMT), the project element officers (PEOs), and systems engineering.

e. Presents a basic schedule for the performance of tasks by relating each task to the time frame of major program events.

f. Indicates the interrelationships of the M-LEM with the remaining logistic elements.

3
REFERENCE DOCUMENTS

The following document listing is provided as a reference source relating to the implementation of an ILS program and the Maintainability Interface logistic element.

DoD Directive 4100.35	Development of Integrated Logistic Support for Systems/Equipment, 1 October 1970
DoD 4100.35G	Integrated Logistic Support Planning Guide for DoD Systems and Equipment, 15 October 1968
AFR 800-8	Integrated Logistic Support (ILS) Program for Systems and Equipment, 27 July 1972
AFP 800-7	Integrated Logistic Support Implementation Guide for DoD Systems and Equipments, March 1972
MIL-STD-470	Maintainability Requirements (for Systems and Equipments), 21 March 1966
SAMSO Supplement to AFR 800-8	Integrated Logistic Support (ILS) Program for Systems and Equipment, 7 September 1976
ICBM PO ED 77-6	System Requirements Analysis Programs for the MX Weapon System, 24 May 1977
ICBM PO ED 77-3	ICBM Program Office Engineering Directive for the Integrated Test Plan for MX Weapon System, 22 June 1977
ILSP	Missile-X Integrated Logistic Support Plan, June 1977
PO Manual	ICBM PO Project Officers' Manual, 1 July 1976
SAMSO/MNL Publication	ILS Management Information System Report, 31 August 1977
AFR 80-5	Reliability and Maintainability Programs for Systems, Subsystems, Equipment and Munitions, 2 July 1973
AFSC Supplement to AFR 80-5	(Same title), 20 December 1974
SAMSO Supplement to AFR 80-5	(Same title), 30 September 1976

4
PROGRAM MANAGEMENT

Management of the MX Weapon System Program is the responsibility of the ICBM Program Office. The Program Manager has the overall responsibility for acquisition and integration management of the program, and is supported by the following Directorates within the ICBM Program Office:

Logistics

Engineering

System Acquisition Management Support

Procurement and Production

Deployment

Program Control

The ICBM Program Office comprises a team of Air Force and contractor personnel. That office operates with a functionally decentralized organizational structure, which has resulted in the implementation of the Project Element Management System. In this system, the program is divided into a series of discrete, functional elements, each managed as an entity by a designated Project Element Officer responsible for monitoring the technical, cost, and schedule performance of one or more MX associate contractors. No prime contractor will be designated for the MX Program. Rather, the ICBM Program Office will function as the system integrator.

4.1 ILS PROGRAM ORGANIZATION

4.1.1 Deputy Program Manager for Logistics

The Deputy Program Manager for Logistics (DPML) was assigned from HQ AFLC with the concurrence of the MX Program Manager, and serves as the focal point for MX logistics management. The DPML and his organization are an integral part of

the ICBM Program Office and form the Directorate of Logistics (MNL). Within the MX Program, it is the responsibility of the DPML to assure that:

a. Continuous attention is given to logistic support posture and costs throughout the acquisition process.

b. Tradeoff studies affecting system design are evaluated to determine their impact on supportability, life cycle cost, and operational requirements.

c. All objectives of ILS are achieved for the MX Weapon System.

The DPML will draw upon the support of the designated logistic element managers to obtain timely contributions to those system design and support decisions which affect logistic support costs and effectiveness throughout the life of the system.

4.1.2 Logistic Element Managers

As discussed in paragraph 4, the Program Office operates with a functionally decentralized organization structure. This decentralization has positioned ILS elements (as defined by AFR 800-8) outside of the Logistics Directorate, in company with those engineering design elements (e.g., Reliability) normally external to the logistics organization. Logistic element managers have been designated within each functional logistic-related area. In addition, the Technical Data and Supply Support elements are further separated into subelements to gain maximum benefits from the decentralized organizational structure. The elements, by Directorate, are shown in Figure 4-1.

The manager for each element is the single point of contact for the DPML in the management of all logistic integration aspects of the assigned element. The LEM assures that the tasks associated with his element, as defined within this Logistic Element Management Plan, are accomplished. He provides liaison and coordination among the other logistic element managers as required for the achievement of integrated logistic support. He further assures that all relevant ILS data are collected, analyzed, reported, and disseminated, as appropriate, for his element.

Each LEM also plays a key role in supporting the Program Office's function as integrating agency of all associate contractor activities. The M-LEM supports systems engineering and the PEOs by providing the management assistance needed to identify the contractual requirements relative to his element. In so doing,

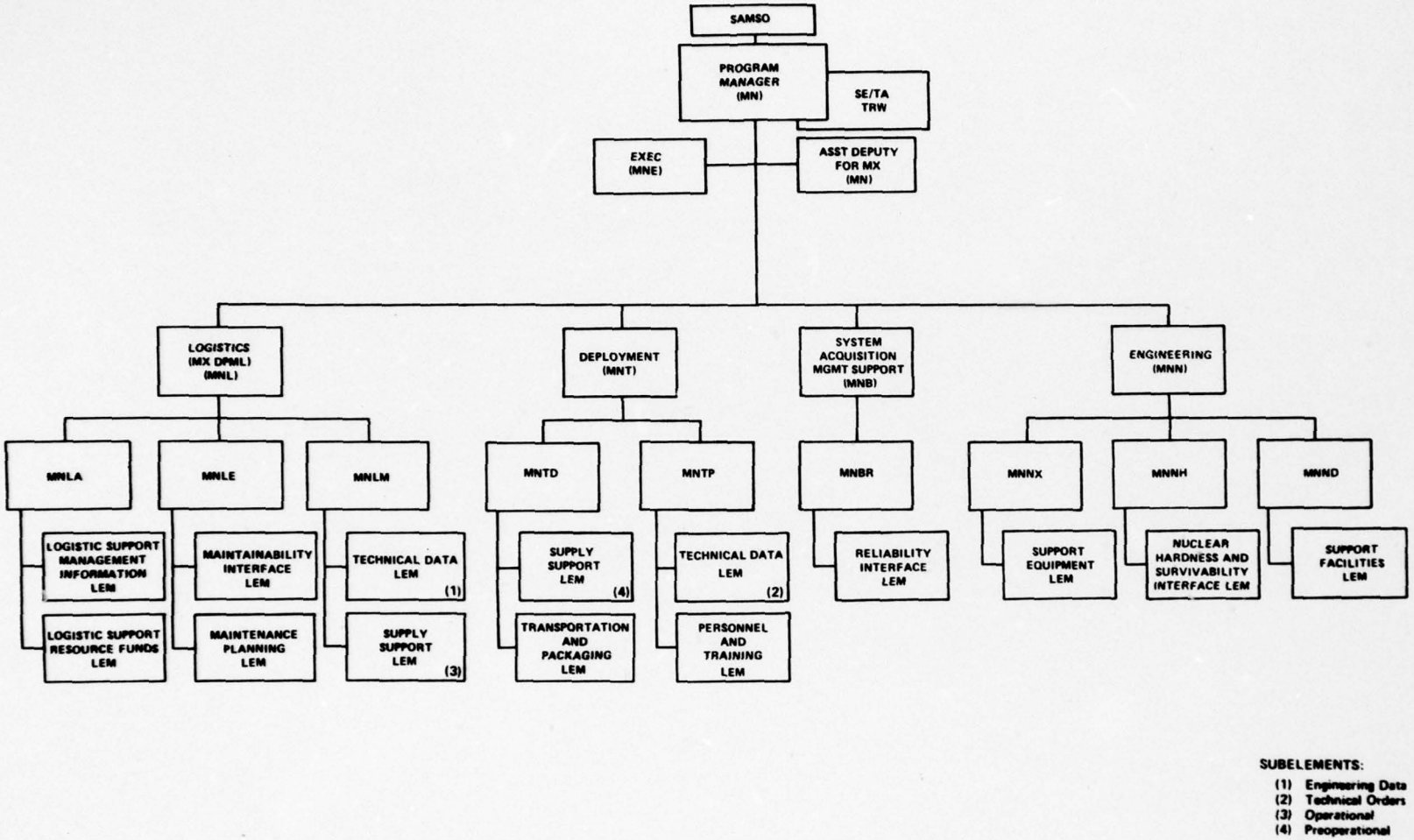


Figure 4-1. MX Program Logistic Element Managers

he assures that a system integration approach is used in determining the requirements for each associate contractor. Due to the large number of associates involved, a significant coordination effort will be required by the LEM within his logistic element to maintain cognizance of the activities that impact on logistics.

Each LEM is a member of the Integrated Logistic Support Management Team, and through active participation as a team member he supports the DPML in managing the accomplishment of the Program Office's acquisition logistics tasks.

It is through the exchange of information at ILSMT meetings and the interrelationships of LEMs that the DPML will acquire the program information necessary to assure the integration of logistic support elements into the total program requirements.

4.2 ILS MANAGEMENT INFORMATION SYSTEM

The ILS Management Information System was developed to assist the DPML and all logistic element managers in their efforts to achieve the logistic objectives of the MX Weapon System. Management and direction of the information system's activities are the responsibility of the DPML. This responsibility is discharged primarily through his position as chairman of the ILSMT and of technical interchange meetings.

Successful implementation of the ILS MIS depends on each LEM's accomplishment of the tasks delineated in his LEM plan, through fulfilling his reporting responsibilities, and through active participation in the ILSMT.

The ILS Management Information System Report dated 31 August 1977 provides a complete description of the ILS MIS and the LEMs' role in implementing the system. Figure 4-2 depicts the information flow of the ILS MIS, and will serve as an aid in understanding the data input/output and coordination activities of the M-LEM as defined in Sections 5 and 6 of this plan.

In general, much of the management information will involve estimates, or other planning data in which the quality of the data used will vary over some acceptable range. The criteria provided for use by the LEMs in describing the relative quality of MIS data are presented in tables within the Integrated Logistic Support Management Information System Report. Assistance to the LEMs for participating in the ILS MIS, as both contributor and user, will be provided by the Logistic Support Management Information LEM.

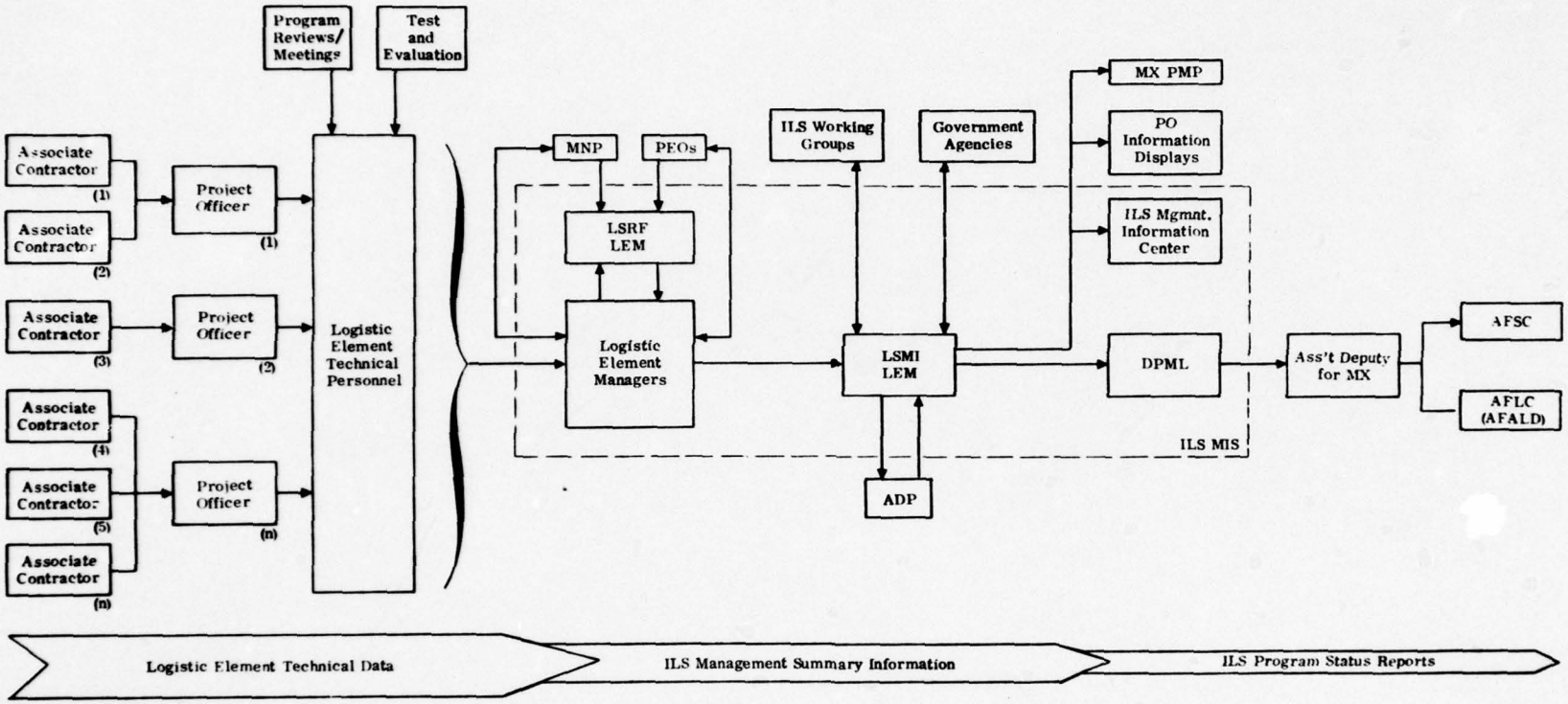


Figure 4-2. Information Flow of the ILS MIS

A typical schedule showing program events for the logistic element addressed in this plan is shown in Appendix C. This schedule depicts the general type of information required as input to the management information system for tracking the progress of each associate contractor in fulfilling the requirements for a specific logistic element. This type of information is also a prerequisite to the LEM's effort of tailoring the task schedule shown in Table 6-1 to each associate contractor's unique development activities.

5
GENERAL REQUIREMENTS

5.1 INTEGRATED LOGISTIC SUPPORT PROGRAM

Integrated Logistic Support is a concept that encompasses the total and timely support of a system/equipment, within acceptable life cycle cost criteria, for the duration of its useful life. Realization of this concept is achieved through planning and analysis tasks for the subsequent procurement of all required support as part of the total acquisition process.

An Integrated Logistic Support program has been implemented for the MX Weapon System to assure that the ILS concept impacts the system design process in a manner that will improve supportability and control O&S costs. Within the ILS program, logistic elements have been identified (see paragraph 1.1). These elements are areas of support activity which, when collectively considered, provide the basis for the acquisition of the human, material, and financial resources required to maintain a system in an acceptable state of operational readiness within affordable cost criteria.

Essentials of the ILS program include the analysis and definition of quantitative and qualitative logistic support requirements; the prediction of logistic support costs; and the performance of tradeoff studies and evaluations. The responsibility for performance of these efforts rests with the ICBM Program Office and its supporting directorates. However, the responsibility for monitoring and assuring the accomplishment of these efforts has been assigned to the logistic element managers. Each Logistic Element Management Plan delineates the detailed areas of responsibility for a specific LEM.

Figure 5-1 depicts the information flow among the various LEMs during the performance of their ILS efforts. While the information flow will primarily be in the direction indicated by the arrows in that diagram, situations will arise where information must be passed in both directions. Additionally, the information flow might be influenced by variations in logistic information requirements among the configuration end items. Figure 5-1a (inset in Figure 5-1) indicates that the impact of the ILS concept on the system design is achieved through the logistic support analysis efforts.

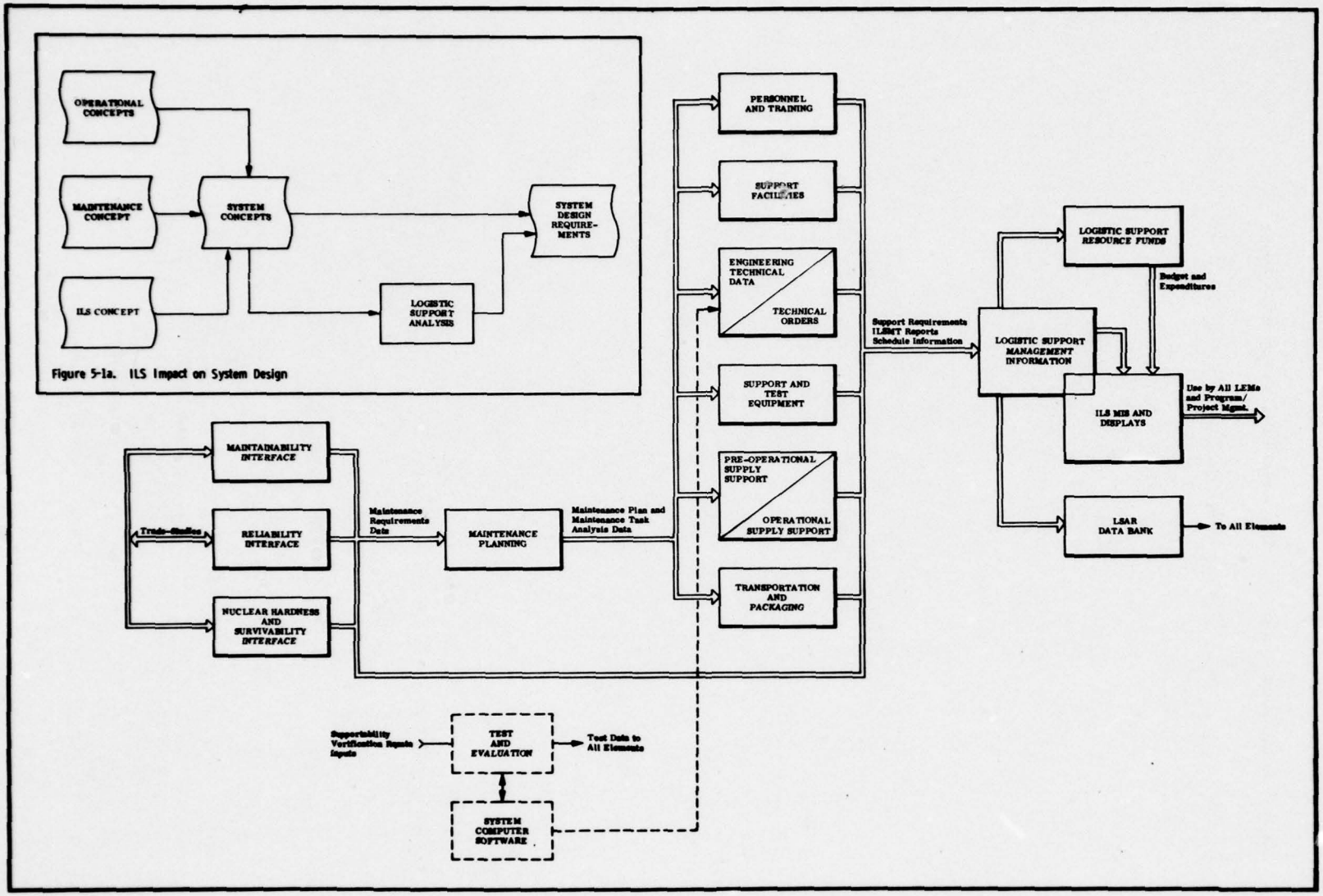


Figure 5-1. Primary Interface Relationships of Logistic Elements

5.2 MAINTAINABILITY INTERFACE LOGISTIC ELEMENT

Maintainability is both a system effectiveness parameter and an engineering design discipline. The Maintainability Interface LEM is primarily concerned with the impact on system effectiveness caused by a requirement to perform preventive and restorative maintenance actions. He must assure that the design process (i.e., the engineering discipline aspect of maintainability) gives careful consideration to system design features that will enable maintenance actions to be performed within specified time limits and with minimum demand for support resources. Thus, maintainability is expressed in terms of both quantitative parameters (e.g., MTTR) and qualitative design features (e.g., design for minimum complexity). The impact of quantitative parameters on system effectiveness is reflected in such terms as operational availability and life cycle cost to maintain a specified level of effectiveness.

The Maintainability Interface logistic element encompasses those activities involved in assuring that the impact of maintainability on ILS is identified, evaluated, and documented for subsequent feedback into the design process. The M-LEM will perform a number of tasks to assure that system/equipment maintainability data are utilized in the development of support requirements. These data are primarily the output of maintainability analysis, which influences maintenance requirements analysis. The maintainability analysis provides source data for the maintenance task analyses which provide the basis for determining the support resources required to accomplish the maintenance tasks.

Early in the design stage, the primary interface of maintainability is with the discipline of reliability. The algorithms for computing operational availability and LCC use the quantitative parameters of these two elements. Design and performance tradeoffs are performed between maintainability and reliability to achieve a preferred design for satisfying the system availability requirements and minimizing life cycle costs. Thus, a significant coordination effort between M- and R-LEMs and their respective engineering groups will ensue from the tradeoff analyses.

Similarly, maintainability tradeoffs are conducted with nuclear hardness and survivability. The M-LEM interfaces with the NH&S-LEM and the MP-LEM on matters where maintenance requirements and/or the methods of performing maintenance tasks could compromise the nuclear hardness integrity of the system.

Secondary relationships exist among the M-LEM and other LEMs to the extent that they are concerned with the compatibility between support resources (personnel, test equipment, technical orders, etc.) and the maintainability design features of the system.

In the performance of his assurance functions the M-LEM will coordinate, as necessary, with PEOs, OPRs, and maintainability engineers. Additionally, in areas such as test and evaluation and software support that do not have LEM representation, coordination may be required with POs. His membership in the ILSMT will require the preparation of status reports, the initiation of problem/impact statements, the development of schedule information for the MIS, and the resolution of assigned action items.

6
M-LEM MANAGEMENT RESPONSIBILITIES AND TASKS

6.1 RESPONSIBILITIES

The Maintainability Interface LEM assists the Deputy Program Manager for Logistics in establishing and achieving the system maintainability goals that are integral to the overall ILS goals for the MX Weapon System Program. The M-LEM assures that maintainability is an integral part of the system/equipment design process by:

a. Coordinating the Maintainability Interface element of logistics for the MX Program.

b. Assuring that quantitative parameters and qualitative design features identified during SRA/LSA efforts are compatible with the maintainability program.

c. Acting as the focal point for the DPML in the coordination of all maintainability matters and apprising the DPML, through active participation at ILSMT and TI meetings, of any actual or potential maintainability problems that could impact logistic support capability.

d. Establishing lines of communication with each PEO and assisting him in all matters pertaining to the logistic aspects of maintainability.

e. Providing maintainability data input to the ILS Management Information System through close liaison with the LSMI-LEM.

6.2 MANAGEMENT TASKS

The scope of each task identified in this plan must be tailored by the M-LEM for each specific procurement. Consequently, the applicable data items and the degree of coordination activities will vary with the scope of the task.

While the tasks identified below are intended to be comprehensive relative to the scope of the M-LEM's responsibilities, additional tasks may become apparent during the implementation of this plan. The LEM is responsible for assuring that these new tasks are planned and scheduled for each applicable procurement. The new tasks should be documented, this plan updated as applicable, and the appropriate information provided to the LSMI-LEM for updating the MIS and its information displays.

The following paragraphs describe the tasks to be performed. Table 6-1 (see paragraph 6.3) presents a task summary and indicates by the respective columns of the table the applicable data items, expected coordination required for the tasks, and a schedule relating tasks to major program events.

- Task 1

Assure that a Maintainability Program Plan (MPP) is prepared for each configuration end item (CEI). This plan may be required as part of the response to a request for proposal (RFP), or it may be submitted in accordance with a specific CDRL item after contract award. In either case the M-LEM coordinates with the PEO, and maintainability engineering to verify that MPP requirements have been established; that the delivery requirements for the plan have been identified; that review criteria have been established, and that implementation of the plan conforms with the time-frame for major MX Program milestones and CEI design reviews. Appropriate documentation such as AFSC Form 40 and data item descriptions must be prepared/reviewed/approved for the hardware procurement package. Each MPP must be reviewed/approved prior to implementation by the contractor. The M-LEM may assist in developing in-house review criteria for MPP evaluation.

- Task 2

Assure that each associate contractor's maintainability program is implemented in accordance with the approved MPP and schedule. Through close liaison with the PEO and familiarity with the requirements of both the SOW task and the approved MPP, the M-LEM tracks the implementation of the program and provides the LSMI-LEM with schedule updates/revisions to reflect program changes. This task includes evaluating the MPP to assure that its scheduled implementation is consistent with the requirements of the ILSP and the conduct of logistic support analyses.

- Task 3

Assure that the contractors' methods and models for performing maintainability analyses are valid with respect to providing realistic results. Assist the PEO and the Maintainability Engineer, as requested, in developing the in-house evaluation criteria to assure that each contractor's technical approach to maintainability analysis is evaluated from a standard set of criteria.

- Task 4

Assure that system-level quantitative maintainability requirements are developed in consonance with system specifications for availability and reliability, with due consideration given to hardness maintenance requirements, qualitative maintainability design features, and the maintenance concept. This task requires the combined efforts of the M-, R-, MP-, P&T-, and NH&S-LEMs and the respective engineering groups. Examine the results of tradeoff studies performed by the engineering groups and assist as necessary in providing inputs to the tradeoff studies that reflect the logistic support and cost goals for the MX Program. Assist the engineering groups in developing a set of evaluation criteria upon which decisions will be based concerning the compatibility of the separate disciplines. Use the resultant maintainability requirements in preparing the maintainability sections of the system-level LSAR data sheets A.

- Task 5

Assure that subsystem/equipment maintainability predictions and allocations are consistent with system level operational requirements for availability, the established maintenance concept, and qualitative design features. Assure that the Maintainability Allocation, Assessment, and Analysis Report is reviewed in consonance with the design analysis, tradeoff study, and specification data items delineated in Table 6-1. Conduct this task concurrently with tasks 6, 7, and 8. Assure that coordination

meetings are arranged with the appropriate LEMs and/or engineering personnel to facilitate the review of applicable documentation and resolution of inconsistencies between configuration end item and system level maintainability requirements. Establish coordination with the MP-LEM to verify that maintenance requirement analysis data have been accurately translated into discrete maintenance tasks consistent with the MTTR criteria.

- Task 6

Assure that tradeoffs between maintainability and performance, reliability, nuclear hardness and survivability, and human factors engineering disciplines are consistent with the system LCC/DTC goals. This task requires coordination with the LCC/DTC Manager in MNNX and MNPC through the LSMI-LEM for providing updated maintainability parameter inputs to the LCC/DTC models. Joint coordination with the R-, NH&S-, and P&T-LEMs should be arranged to assure the simultaneous revision of all input parameters and thus avoid multiple iterations of the model. Evaluate LCC/DTC model runs to assure that the impact of the updated maintainability parameters has attained the desired results within the LCC/DTC goals.

- Task 7

Assure that system level maintainability analyses are compatible with the overall zero indenture LSA and that these analyses include an assessment of the impact on reliability and hardness maintenance aspects of NH&S. This effort requires a coordinated review by the M-, NH&S-, and R-LEMs of the critical fault ambiguities documented in fault matrices during failure mode analysis. The results of the effort verify that the total failure rate of all contributing failures does not exceed a threshold value established by SAMSO. Assist the reliability and maintainability engineering groups and the PEOs in developing the guidelines for specifying types of ambiguities requiring additional analysis.

- Task 8

Assure that LSAR data sheets A and B pertaining to maintainability parameters are prepared, evaluated, and approved. Selectively review LSAR sheets A and B prepared by associated contractors to assure that the quality of information is consistent with the requirements for use by other LEMs and for establishing realistic estimates of other support elements. Assure the timeliness of the review and evaluation cycle within the maintainability engineering group, and that the LSAR data sheets are forwarded to the LSMI-LEM for input to the LSA data bank.

- Task 9

Assure that maintainability test and test data requirements are adequately identified during the system-level test planning analysis (TPA) process and that these requirements are adequately reflected in the Integrated Test Plan (ITP) and FSD contractual provisions. Coordinate with the T&E Project Officer to jointly identify maintainability test and demonstration planning requirements during the system-level TPA process. At the subsystem/equipment level, assure that the associate contractors' TPAs adequately identify maintainability tests and test data and that these requirements are incorporated into the detailed test plans.

Joint efforts by the LEMs and PEOs will be aimed at cost effective testing schedules to accommodate the requirements of several disciplines simultaneously. This effort assures that subsystem and system level tests provide adequate testing without duplication.

- Task 10

Assure that maintainability demonstration test reports and data are reviewed and evaluated for any indicated impact on logistic supportability and life cycle costs. Review the results of the engineering evaluations of test reports and data to assure that maintainability parameters demonstrated during test are consistent with system level requirements and specifications. This will require simultaneous review of test reports and data for interfacing subsystems/equipments to ensure that all zero indenture level ambiguities previously identified have been adequately resolved. Assure that the requirements of the approved Verification, Demonstration and Evaluation Plan are satisfied.

- Task 11

Assure that demonstration test data are provided as input to update LSAR data sheets A and B. Review updated LSAR sheets A and B to assure that they reflect the most current quantitative maintainability data. Coordinate these reviews through the respective PEO and assure that the updated LSAR data sheets are forwarded to the LSMI-LEM for input to the LSAR data bank.

- Task 12

Develop and provide inputs and updates to the ILSP. This task is shared by all LEMs and is accomplished through guidance provided by MNLM. Participate in the update of this Logistic Element Management Plan, which is considered a supplementary document to the ILSP. Participate in the review cycle of the updated ILSP.

- Task 13

Assure that contractor-generated ECPs are reviewed and evaluated with respect to maintainability and their impact on logistic supportability and life cycle cost. Through coordination with the PEO and maintainability engineers, assure that the ECPs are evaluated in terms of effects on the overall MX System in addition to the CEI for which they are written. Brief the DPML and the ILSMT on the results of any ECP evaluations that indicate a potential change to maintainability parameters affecting supportability or life cycle cost. Track the implementation of the ECP, assure that LSAR data sheets are updated to reflect changes in maintainability parameters, and assure that updated cost factors are coordinated with the LCC/DTC Manager through the LSMI LEM.

6.3 PREFACE TO TASK TABLE

Table 6-1 lists the tasks discussed in Section 6.2, together with the corresponding data items and coordination required in the performance of the tasks. The schedule shown in the table indicates the availability dates of data items relative to major program milestones. The M-LEM will prepare a schedule for the completion of the tasks applicable to each hardware end item, using contract award dates as the basis for assigning calendar dates to each schedule.

TABLE 6-1. MAINTAINABILITY INTERFACE TASK TABLE (Sheet 1 of 6)

Tasks	Applicable Data Items	Coordination	Milestone Schedule
1. Assure that a maintainability program plan (MPP) is prepared for each CEI.	(1) AFSC Form 40 (2) MPP (3) In-house evaluation criteria (4) CDRL (DD Form 1423)	Maint. Engr. PEOs	RFP Release, Contract Award, SDR, PDR, CDR, FCA, T&E, Production Release CA 30D
2. Assure that the maintainability program is implemented in accordance with the approved MPP and schedule and is consistent with the ISP.	(1) MPP schedule (2) ISP (3) LSA Plan	PEO PEO, MP-LEM PEO, MP-LEM	Continuous CA 60D CA 30D
3. Assure that the end results achievable from the associate contractors methods and models for performing maintainability analyses are valid.	(1) Maintainability Analysis (SRA data) (2) Maint. Allocations, Assessment and Analysis Report (3) ORLA Reports	Maint. Engr. Maint. Engr. Maint. Engr., PEO, MP-LEM	15D PDR, 15D CDR 21D SDR, 21D PDR, 21D CDR 15D PDR, 15D CDR, CDR 60D
4. Assure that system level quantitative maintainability requirements are developed in consonance with system specifications for availability, hardness maintenance requirements, and qualitative maintainability design features.			

TABLE 6-1. MAINTAINABILITY INTERFACE TASK TABLE (Sheet 2 of 6)

Tasks	Applicable Data Items	Coordination	Milestone Schedule: RFP Release · Contract Award · SDR · PDR · CDR · FCA · T&E · Production Release
a. Assure that system level reliability/ maintainability design tradeoffs are performed.	(1) Tradeoff study results (2) System level LSAR sheet A	Maint. Engr. R-LEM	Contract Award → CDR
b. Assure that system level maintainability/ hardness maintenance design tradeoffs are performed.	(1) Tradeoff study results	Maint. Engr. NH&S LEM	Contract Award → CDR
c. Assure that system level HFE/maintainability design tradeoffs are performed.	(1) Tradeoff study results	Maint. Engr. P&T LEM	Contract Award → CDR
5. Assure that subsystem/ equipment level maintainability predictions and allocations are consistent with system level operational requirements for availability, maintenance concept, qualitative design features and hardness maintenance requirements. (See also tasks 6, 7, 8.)	(1) Maint. Allocations, Assessments, and Analysis Report	Maint. Engr., PEO	15D PDR · 15D CDR · CDR 60D
	(2) Maintainability Analysis	Maint. Engr., PEO, MP-LEM	CDR 150D
	(3) System Design Analysis	Maint. Engr., PEO	30D PDR · 30D CDR
	(4) Reliability Allocations, Assessment and Analysis Report	R-LEM	▲ + Quarterly
	(5) Human Engr. Design Approach Document (H-3261A)	P&T LEM (HFE)	30D SDR
	(6) OIS/FTOS Trade Studies	Maint. Engr.	SDR → CDR
	(7) Producibility Studies	Maint. Engr.	▲ at PDR
	(8) Configuration Item Development Spec (E-3102A)	Maint. Engr.	▲ at PDR
	(9) Configuration Item Prod. Fab. Spec (E-3103A)	Maint. Engr.	▲ at CDR
	(10) NH&S Design Analysis and Trade Study Reports	NH&S LEM, Maint. Engr.	30D SDR

TABLE 6-1. MAINTAINABILITY INTERFACE TASK TABLE (Sheet 3 of 6)

Tasks	Applicable Data Items	Coordination	Milestone Schedule
			RFP Release ◆ Contract Award ◆ SDR ◆ PDR ◆ CDR ◆ FCA ◆ T&E ◆ Production Release
	(11) NH&S Design Report	NH&S LEM, Maint. Engr.	30D PDR ▲ 30D CDR ▲
	(12) Design Review Minutes	LSMI-LEM	10 days following each review
	(13) Human Factors Dev. Plan	P&T LEM	CA 60D ▲
	(14) ORLA Reports (R-3549)	MP-LEM	15D PDR ▲ 15D CDR ▲ CDR 60D ▲
6. Assure that tradeoffs between maintainability and performance, reliability, hardness maintenance, and HFE disciplines are consistent with the system cost goals.	(1) LCC/DTC Tradeoff Study Report	LSRF, LSMI, R, NH&S, MP-LEMs, Maint. Engr., LCC/DTC Manager at Program Office	CA 60D ▲ 30D SDR ▲ 30D PDR ▲ 30D CDR ▲
	(2) DTC Target and Allocation Report		▲
	(3) LCC Estimate Report		▲ ▲ ▲
	(4) Cost Estimate Data Base		▲ ▲ ▲
	(5) Risk Reduction Report		▲ ▲
	(6) CI O&S factor goals, per Task 4		▲
7. Assure that system-level maintainability analyses are compatible with zero indenture level logistic support analyses and that the impact on hardness maintenance and reliability is coordinated with the cognizant LEMs and engineering personnel. Assure that the results of zero indenture level logistic support analyses are consistent with the system specifications for availability.	(1) Maintainability Analysis	Maint. Engr., R, NH&S, MP-LEMs Interfacing PEOs	15D PDR ▲ 15D CDR ▲
	(2) FMEA (System Design Analysis Report)		30D PDR ▲ 30D CDR ▲
	(3) Fault matrices resulting from FMA		▲
	(4) SAMSO generated failure rate thresholds	R-LEM, Rel. engr.	▲

TABLE 6-1. MAINTAINABILITY INTERFACE TASK TABLE (Sheet 4 of 6)

Tasks	Applicable Data Items	Coordination	Milestone Schedule: RFP Release / Contract Award / SDR / PDR / CDR / FCA / T&E / Production Release
8. Assure that the applicable LSAR data sheets pertaining to maintainability are prepared, evaluated, and approved. This task includes:			
a. Assuring that data recorded on LSAR data sheets A have been prepared with due considerations to reliability, hardness maintenance, and human factors engineering disciplines.	LSAR data sheets A. See Task 4 and 5 for related data items.	Maint. Engr., R, NH&S, P&T, MP-LEMs PEOs when subsystem sheet A is prepared by associate	▲——▲——▲
b. Assuring that contractor submitted LSAR data sheets pertaining to maintainability are reviewed in a timely manner and forwarded to the approval authority for distribution and subsequent input into the LSA data bank.	LSAR sheet B	Maint. Engr., MP-LEM	▲ Updates as required →
c. Reviewing in-house generated summary reports of LSAR data for trends impacting on system level maintainability requirements.	LSAR sheets B, LSAR summary reports	Maint. Engr., MP-LEM	▲——▲——▲——▲
9. Assure that maintainability tests and test data requirements are adequately identified during the Test Planning Analysis (TPA) process. This includes:			
a. Assuring that maintainability demonstration requirements are incorporated into the Integrated Test Plan (ITP).	(1) ED 77-3	T&E PO Maintainability Engr.	▲

TABLE 6-1. MAINTAINABILITY INTERFACE TASK TABLE (Sheet 5 of 6)

Tasks	Applicable Data Items	Coordination	Milestone Schedule: RFP Release / Contract Award / SDR / PDR / CDR / FCA / T&E / Production Release
b. Assuring that the ITP requirements for maintainability demonstrations are included in the FSD contractual provisions.	(1) Contract SOW (2) ED 77-3 (3) CDRL and applicable DIDs per TPA, and test reports	PEOs, Maint. Engr.	▲ at Contract Award
c. Assuring that the requirements for test data, the measures of effectiveness, evaluation criteria, and the algorithms specified in detailed test plans for maintainability demonstrations during DT&E are consistent with those to be used by AFTEC during IOT&E.	(1) Detailed test plans (T-3707*) for Maint. Demonstrations. *DID DI 3538/M if specified by CDRL	T&E PO Maint. Engr. AFTEC representatives PEOs	▲—▲—▲ PDR, CDR, T&E
	(2) Verification, demonstration, evaluation plan	Maint. Engr., PEO MP-LEM	▲—▲ PDR, CDR
d. Assuring compatibility between quantitative and qualitative maintainability parameters to be assessed by demonstration tests.	(1) Detailed Test Plans (T-3707) for Maintainability Demonstration Tests	PEO, Maintainability Engineering, P&T and MP-LEMs	▲—▲—▲ PDR, CDR, T&E
e. Assuring that tradeoff studies are performed involving test objectives, schedules, and budgeting constraints that may affect the scope of maintainability demonstration testing, and the simultaneous testing of other disciplines.	(1) In-house trade study results (2) Integrated Test Plan (3) Detailed Test Plans for Maint. Demonstration and other disciplines where concurrent testing is cost effective.	Maint. Engr., P&T, MP, LSRF LEMs T&E PO PEOs and other LEMs where concurrent testing is cost effective.	▲—▲—▲ PDR, CDR, T&E

TABLE 6-1. MAINTAINABILITY INTERFACE TASK TABLE (Sheet 6 of 6)

Tasks	Applicable Data Items	Coordination	Milestone Schedule: RFP Release / Contract Award / SDR / PDR / CDR / FCA / T&E / Production Release
10. Assure that maintainability demonstration test reports and data are reviewed and evaluated for any indicated impact on logistic supportability and life-cycle cost.	(1) Test Reports, Maintainability, Demonstration (T-3718/M) (2) Verification, Demonstration and Evaluation Plans (S-6170)	Maint. Engr., PEOs, T&E PO MP-LEM, PEOs	(30 days after test) (Verify maintenance demonstration requirements are met during test)
11. Assure that demonstration test data are provided as updates to the applicable LSAR data sheets.	(1) Test Reports, Maintainability Demonstration (T-3718/M)	Maint. Engr., PEOs	(30 days after test)
12. Support the preparation and updating of logistic documentation.	(1) ILSP (2) ITP (3) M-LEM Plan	Maint. Engr. LSMI-LEM PEOs	As required
13. Assure that contractor generated ECPs are reviewed and evaluated with respect to maintainability and the impact on logistics.	ECPs (E-3128/M)	PEO, Maint. Engr. MNBC	As required

APPENDIXES

APPENDIX A

MISSILE-X PROGRAM
LOGISTIC ELEMENT MANAGER DIRECTORY
Col. L.E. Eklund, DPML

Logistic Element	Manager	Code	Ext.	Room
Reliability Interface	Capt. T.M. Palmer	MNBR	5359	421
Maintainability Interface	Capt. A.D. Wadsworth	MNLE	4523	619
Nuclear Hardness and Survivability Interface	Capt. W.R. Jacobs	MNNH	7843	711
Maintenance Planning	Lt. Col. R.W. Ayars	MNLE	4523	619
Support Equipment	Lt. Col. B.W. Woolverton	MNNX	7005	138
Supply Support (Preoperational)	Mr. F.C. O'Connor	MNTD	6481	600
Supply Support (Operational)	Mr J.A. Davidson	MNLM	5321	621
Transportation and Packaging	Mr. R.W. Riggs	MNTD	5474	600
Technical Data (Engineering)	Mr. L.E. Onstott	MNLM	5321	621
Technical Data (Technical Orders)	Maj. L.W. Cooper	MNTP	6684	609
Support Facilities	Mr. F.E. Longan	MNND	6891	408
Personnel and Training	Maj. L.W. Cooper	MNTP	6684	609
Logistic Support Resource Funds	Capt. H.B. Robbins	MNLA	5395	623
Logistic Support Management Information	Mr. J.L. Peterson	MNLA	5386	623

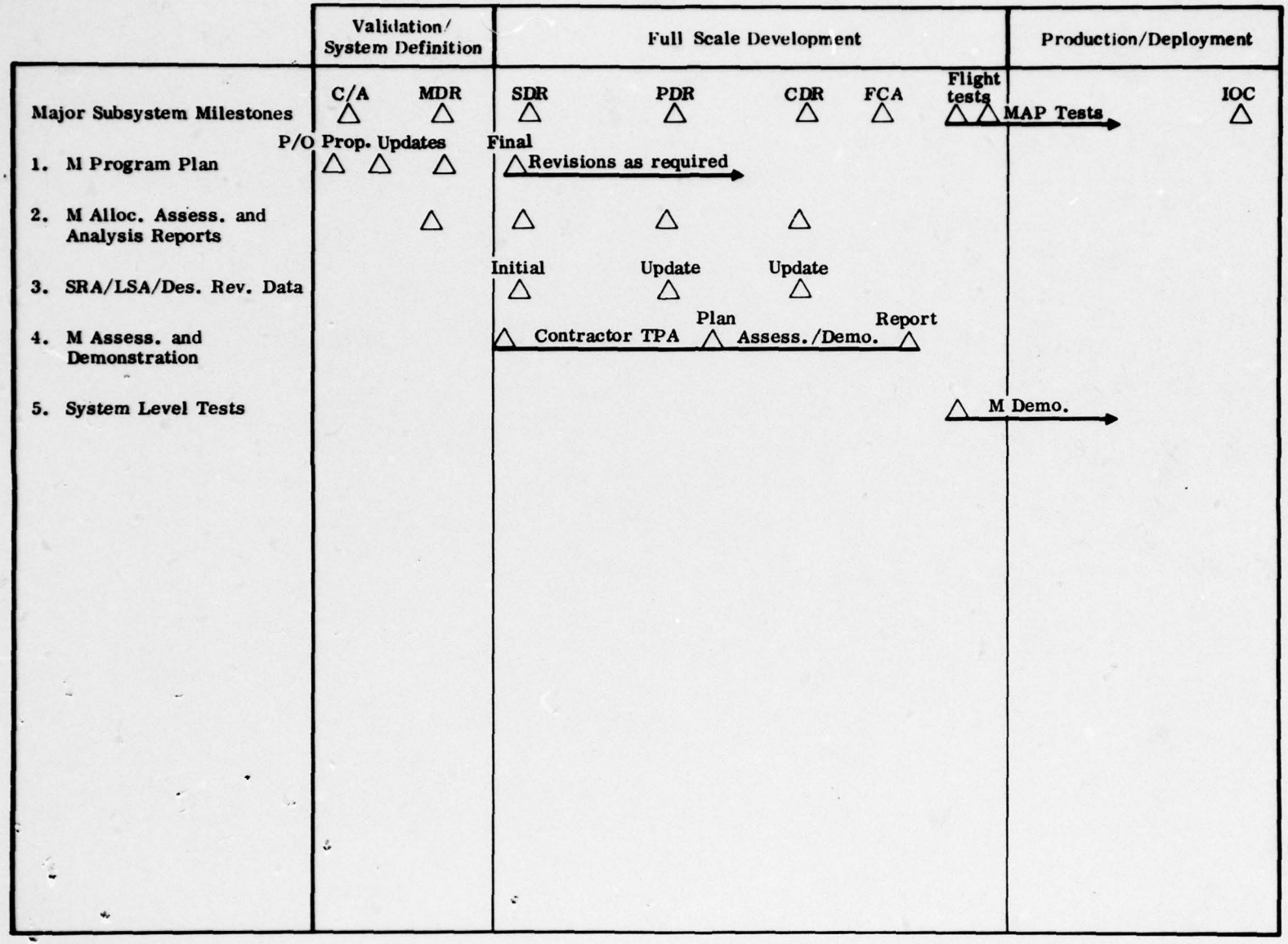
APPENDIX B
ACRONYMS AND ABBREVIATIONS

A&CO — Assembly and Checkout
ADP — Automatic Data Processing
AFALD — Air Force Acquisition Logistics Division
AFLC — Air Force Logistics Command
AFSC — Air Force Systems Command
AFTEC — Air Force Test and Evaluation Center
BTWS — Buried Trench Weapon System
C/A — Contract Award
CDR — Critical Design Review
CDRL — Contract Data Requirements List
CDRS — Contract Data Requirements Substantiation
CDSR — Cost Data Summary Report
CEI — Configuration End Item
CFSR — Contract Funds Status Report
CPR — Cost Performance Report
DPML — Deputy Program Manager for Logistics
DT&E — Development Test and Evaluation
FCA — Functional Configuration Audit
FCHR — Functional Cost Hour Report
FMA — Failure Mode Analysis
FSD — Full Scale Development
ICBM — Intercontinental Ballistic Missile
IOT&E — Initial Operational Test and Evaluation
ILS — Integrated Logistic Support
ILSMT — Integrated Logistic Support Management Team
ILSP — Integrated Logistic Support Plan
ISP — Integrated Support Plan
ITP — Integrated Test Plan
LEM — Logistic Element Manager

LSA — Logistic Support Analysis
LSAR — Logistic Support Analysis Record
MDR — Missile Design Review
MIC — Management Information Center
MIS — Management Information System
MPP — Maintainability Program Plan
MTBF — Mean Time Between Failures
MTTR — Mean Time to Repair
MX — Missile-X
OPR — Office of Primary Responsibility
OT&E — Operational Test and Evaluation
PCA — Physical Configuration Audit
PDR — Preliminary Design Review
PEO — Project Element Officer
PMP — Program Management Plan
PO — Project Officer
RPP — Reliability Program Plan
SAMSO — Space and Missile Systems Organization
SBWS — Shelter Based Weapon System
SDR — System Design Review
SOW — Statement of Work
SRA — System Requirements Analysis
T&E — Test and Evaluation
TI — Technical Interchange
TPA — Test Planning Analysis

APPENDIX C

MAINTAINABILITY INTERFACE ELEMENT SCHEDULE



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